

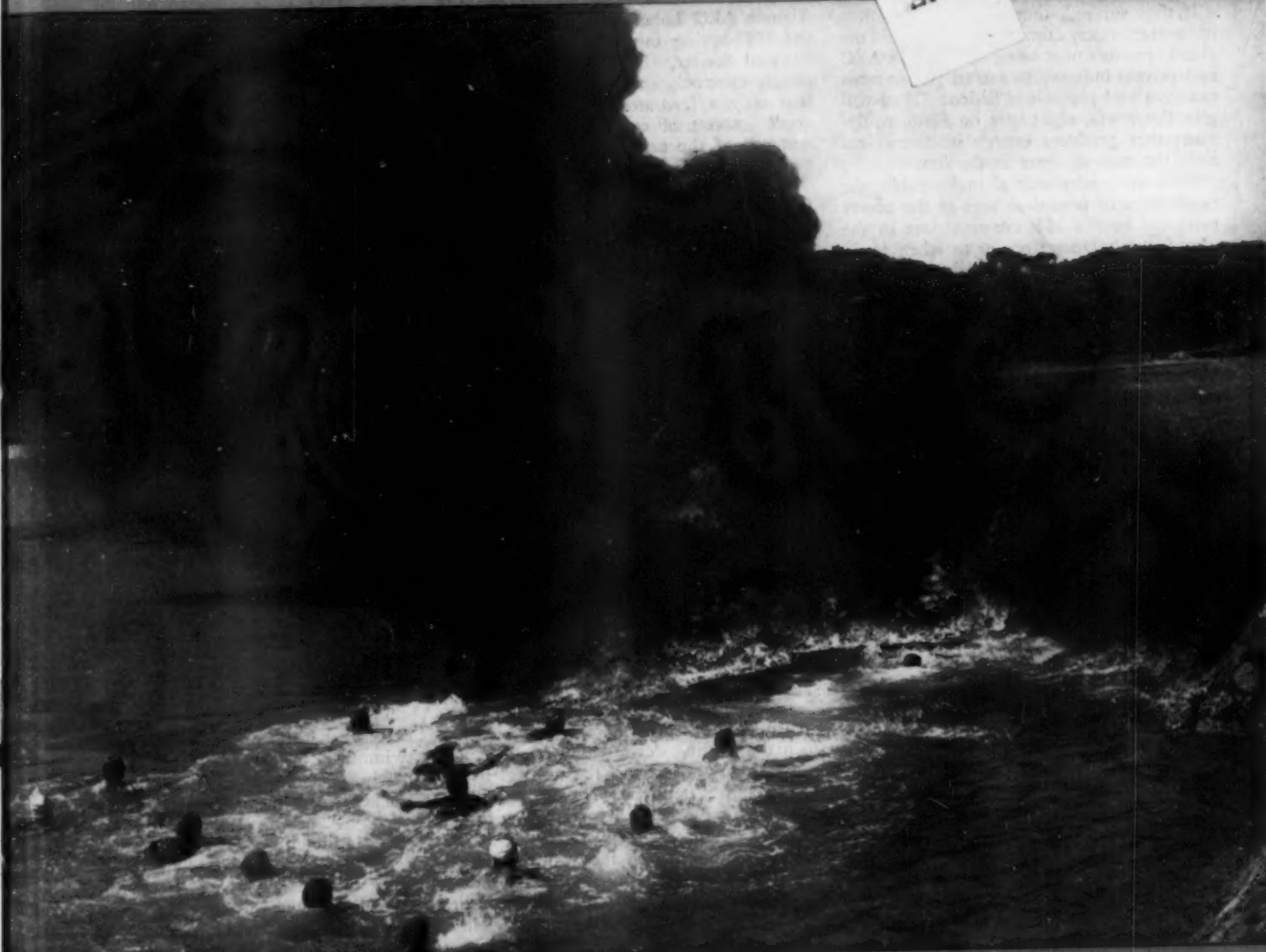
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July 12, 1952

VOL. 62, NO. 2. PAGES 17-32

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Survival Swimming

See Page 18

A SCIENCE SERVICE PUBLICATION

PHYSICS

Harness H-Bomb Reaction

Power for industry may come from harnessing the H-bomb reaction. Two problems of starting mechanism and control of power production remain.

► THE VAST power of the H-bomb may soon be harnessed for industry. Scientists of the Atomic Energy Commission are working now on the problem of controlling the thermonuclear reaction and believe this will one day become a new source of immense power for the world.

If they succeed, they will have a source of power many times greater than the atomic reactors now being built by the AEC and private industry to extract power from uranium and plutonium fission. They will give the world, right here on earth, equipment that produces energy in almost exactly the same manner as the sun.

Plans are under way to make public the possibilities of peacetime uses of the power produced by the H-bomb sometime in the near future. Discussions as to when to do this have been going on both within the AEC and on Capitol Hill.

Two big problems have to be solved before power can be produced with a thermonuclear reaction. First, a starting mechanism, not necessarily a temperature of the order of a million degrees Centigrade, must exist. Second, control must be achieved of the vast output of power that occurs when atoms of hydrogen are brought together to produce helium and a huge by-product of billions of electron volts of energy.

Some scientists in the AEC think these two problems have already been theoretically licked and are planning to see whether their solutions work in the laboratory. The solution to the triggering temperature problem is based upon work done at the California Institute of Technology by Dr. W. A. Fowler and his associates.

It is believed that an H-bomb is triggered by the "old-fashioned" A-bomb, made of plutonium. The A-bomb, at the instant of its explosion, produces the high temperature necessary to trigger the thermonuclear reaction in the hydrogen, the bringing together of the hydrogen atoms used in the bomb.

The power so produced is, of course, expended almost instantaneously in an explosion calculated to be 1,000 times more powerful than that of the A-bomb.

To get a controlled production of this power so it can be used to turn the wheels of our industries, the A-bomb obviously cannot be used as the trigger action. Scientists indicated that neither will the controlled type of uranium or plutonium reaction in a pile be used to get such temperatures. The trigger will be another method, and it may not need to involve such extremely high temperatures as are believed to be necessary in the sun.

The next step is to control the rate of fusion. There are also indications that this problem has been at least theoretically solved.

The fusion of hydrogen atoms with the production of helium plus power was accomplished several years ago in the Los Alamos AEC Laboratory and reported at the 1949 spring meeting of the American Physical Society. However, this was done on an extremely small scale. It is certain that only a few atoms fused, releasing a small amount of energy. This, however, was one of the experiments leading up to the decision to produce H-bombs.

Several different methods of fusion are open to the AEC scientists. They could try to bring together two atoms of heavy hydrogen, called deuterium, to produce helium plus energy. Or they might use one atom of ordinary hydrogen, a proton, and an atom of hydrogen three times as heavy, tritium.

Eventually the basic principles of hydrogen fusion are likely to be revealed officially, as was the case with the A-bomb in the famous Smyth report. But as with the details of the atomic bomb, the exact details of using the H-fusion reaction are likely to be held secret.

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PUBLIC SAFETY

Survival Swimming Taught

See Front Cover

► LESSONS IN floating, treading water, breath control, jumping, inflating clothing to make floating devices and simple swimming strokes are part of the survival swimming course developed by the American Red Cross for American youth facing future military service.

In cooperation with the armed forces, it was adapted from the functional swimming course provided military personnel during World War II when 40% of all inductees were non-swimmers. During the war, a heavy percentage of all combat deaths were caused by drowning, including many in water fairly close to shore.

Today, it is estimated that 60% of the civilian population of the country cannot swim.

Survival swimming is now being taught by the U. S. Navy at its three training stations, Bainbridge, Md., Great Lakes, Ill., and San Diego, Calif.; by the Air Force in Europe and at a few domestic bases, and at

• RADIO

Saturday, July 19, 1952, 3:15-3:30 p.m. EDT
"Adventures in Science," with Watson Davis, director of Science Service, over Columbia Broadcasting System.

George W. Bailey, executive secretary of the American Institute of Radio Engineers and past president of the American Radio Relay League, discusses "The Future of Electronics."

PSYCHOLOGY

Timing Important in Child's Personality

► THE IMPORTANCE of timing in helping a child develop a happy, good personality is stressed in a new booklet for parents issued by the U. S. Children's Bureau, "A Healthy Personality for Your Child" (see p. 28).

"Good timing is the key to the healthy personality," declares the author, Dr. James L. Hymes, Jr., professor of education at the George Peabody College for Teachers, Nashville, Tenn.

Just as there is a right and a wrong time to give a child a rattle, a bike or an encyclopedia, so there is a right and a wrong time to give him lots of cuddling, to give him jobs to do and skills to learn, or to let him alone.

The book is a popular summary of the Fact Finding Digest given to members of the Midcentury White House Conference on Children and Youth held in Washington last September. While it is written to help parents, it will also prove useful to doctors, teachers, clergymen and anyone who has much contact with children.

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selected installations of the Army and Marine Corps.

Typical of situations which members of the armed forces might face is necessity for swimming through burning oil. In the newly developed course, the Red Cross teaches strokes to enable men to get through safely. A practice class in survival swimming is shown on the cover of this week's SCIENCE NEWS LETTER. The soldiers are using the breast stroke to splash their way through the burning oil.

An instructor's manual in basic and advanced survival swimming—the former for non-swimmers, the latter for persons with some swimming proficiency—is now being distributed to Red Cross chapters so that their volunteer water safety instructors can offer the course immediately to young men expecting induction into the armed forces in the next year. Red Cross water safety instructors already authorized are qualified to teach the survival swimming course without further training.

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PUBLIC HEALTH

Big Trial on Polio

Mass test of serum may rob infantile paralysis of its punch. Doctors hope that gamma globulin shots will protect children from disease.

► THERE MAY be cause for jubilation in thousands of homes in Houston and surrounding Harris County, Tex., scene of the worst infantile paralysis outbreak that region has ever had and a "hot spot" for polio for the nation.

Reason for potential joy in those homes is that several thousand children aged one to six years inclusive have gotten the "shot" of blood gamma globulin which polio fighters believe and hope will give temporary protection against the disease. Other thousands of children of the same age also got "shots," but their shots were made of a gelatin blood substitute. And no one knows who got which.

If gamma globulin works as expected and if the youngsters received it before the polio virus had gotten into their bodies and to their brains and spinal cords, they will escape the disease this summer. Those are two big ifs, however, and no one will know until at least the end of September whether or not the gamma globulin protected the children.

Those who got the gamma globulin are the first of some 75,000 children the National Foundation for Infantile Paralysis hopes to have entered in this year's trials of gamma globulin's protective value. The trials are a continuation of small scale trials made last summer at Provo, Utah.

Both those trials and the ones this year are under the direction of Dr. William McD. Hammon of the University of Pittsburgh, under a grant from the National Foundation. The gamma globulin was furnished by the American National Red Cross.

Results of the Provo trials were inconclusive, largely, scientists think, because the inoculations were given too late, after the epidemic was too far along. And the number of children in the trials was too small.

In the trials this year the inoculations were given to some 35,000 one- to six-year-olds in Harris County. This age group has been selected because 50% of the cases in Harris County so far are among children of this age.

Harris County Medical Society physicians and a team of 25 medical specialists from the National Foundation, plus local nurses, manned eight clinics. About 4,000 children were given the inoculations each day. They were taken first come, first served.

Only the master statistician knows which child got the gamma globulin and which got the identical appearing harmless substitute. On each child's record sheet with his or her name goes the serial number of the vial from which he was inoculated.

Each case of polio developing in a one- to six-year-old child is now being watched to see whether or not he had had one of the inoculations. But it will be at least the end of September before the master statistician has checked all the records and determined how many if any of the children getting the gamma globulin escaped infantile paralysis.

If the shots work as hoped for, their protective effect starts at once and lasts for about three to six weeks. Since the polio epidemic in Harris County and Houston was on the upswing when the trials started, it is hoped that by mid-July, or shortly thereafter, it will have died off.

Gamma globulin is a fraction of blood plasma, already in use for protecting against measles. It contains antibodies for fighting disease germs. Presence of these antibodies in blood depends on the person having been exposed to the germs. While probably not every one has developed antibodies to infantile paralysis, pooled plasma from blood banks of blood from many persons does contain such antibodies. Another source of such antibodies is the globulin fraction from placental blood.

Gamma globulin protection is not lasting. For lasting protection, a person must develop antibodies in his own blood. Such

protection might be given by vaccination against polio, if a safe vaccine could be developed. One such vaccine is under study now, but is not ready for large scale trials this summer.

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AERONAUTICS

Fast-Climbing Jet Armed With Rockets

► ENEMY BOMBERS attempting to invade the United States have a formidable obstacle with the new Lockheed F-94C Starfire from which wraps have now been removed.

It is an all-weather jet interceptor, said to be one of the world's fastest-climbing jet planes in ascending to bomber invasion lanes at a 45,000-foot altitude, and it is armed with 24 air-to-air rockets instead of with guns.

Radar and specialized "brain-like" instruments enable the Starfire to spot an enemy miles away, lock onto the target, track, close, aim and open fire all by itself.

Main duties of the pilot and radar operator are to take the plane off the ground, maneuver to the general target area guided by ground radar, switch on the electronic controls at the proper time, monitor operation of the piloting and rocket-control apparatus during the attack, then land.

This Starfire is an evolution of the Shooting Star, America's first mass-produced jet airplane. It carries 1,200 pounds of electronic equipment, compared with 168 pounds in earlier planes.

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THE SUREFIRE STARFIRE—The all-rocket-armed F-94C pictured above is now being delivered to the U. S. Air Force by Lockheed Aircraft Corporation. Loaded with radar and electronic equipment, the jet interceptor can shoot down invaders with its 24 rockets without its crew ever seeing the enemy.

BIOPHYSICS

Radiation Impairs Fertility

Even relatively low doses may mean that children die before birth, experiments with rabbits exposed to whole body radiation show.

► A WARNING that even relatively low doses of radiation may keep men from fathering live children appears in research by Drs. R. L. Murphree, W. M. Whitaker, J. L. Wilding and J. H. Rust in the University of Tennessee-Atomic Energy Commission Agricultural Research Program, Oak Ridge, Tenn.

In view of their findings with male rabbits exposed to X-rays at the "relatively low levels" of 100, 200 and 300 roentgens, they state:

"Extreme caution should be exercised in the voluntary exposure of humans to ionizing radiation approaching this order of magnitude until further experimental evidence is available."

Their studies were made on rabbits given radiation over the entire body. Most other studies have been on the effects of radiation on either the sperm in test tubes or on the male sex organs with the major parts of the body shielded. The rabbits were mated to normal females that had not been irradiated.

The males had been test-mated before irradiation to make sure that they were fertile before the study.

The irradiation did not affect the ability of the rabbit male cells to fertilize the eggs in the female body. But almost one-third, 32.7% of the rabbits from the fertilized eggs died before birth. And the average litter size of rabbits born alive was only a little over half that in matings between normal females and non-irradiated males.

Whether the live-born rabbits fathered by irradiated males were healthy and continued to live and grow was not learned.

"It is conceivable," the scientists state, "that not all the defective offspring died before or at the time of birth."

In other words, the irradiation to their fathers may have damaged them, even if it did not damage them so badly before birth that they could not survive till birth.

Details of the research are reported in the *JOURNAL OF SCIENCE* (June 27).

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ASTRONOMY

Smallest Known Star

► DISCOVERY OF a star only about one-third as large as the earth has just been announced by Dr. W. J. Luyten of the University of Minnesota, Minneapolis, and Dr. E. F. Carpenter of the Steward Observatory at the University of Arizona, Tucson.

This star, the smallest known, is only 2,500 miles across. It is not much larger than the moon and is smaller than the smallest planet, Mercury.

It would take 300 stars such as this to form a body as large as our sun. The midget star shines so faintly 60,000 stars like it would be needed to give off as much light as the sun. Thus it is one of the faintest stars in the heavens, only a dense red dwarf star being known to be fainter.

The star is only about 150 million miles from our solar system, which is relatively near astronomically speaking. But it glows so feebly that it is 10,000 times too faint to be seen with the unaided eye.

This smallest star is a white dwarf star known only by its catalogue number L 886-6. White dwarfs are noted for their small size, high surface temperature and fantastically high densities.

"The average material of which the star is composed is about 55,000,000 times as dense as water," Drs. Luyten and Carpenter estimate. "As much of the star as you could

put into a match box would weigh 1,000 tons here on earth."

The tiny star is believed to be about 40% heavier than the sun. While it is apparently not a double star, and thus its weight cannot be measured directly, enough is understood about the material in white dwarf stars for the astronomers to compute its mass from its diameter.

Discovery of this midget star is an outgrowth of a long systematic study of faint stars conducted by Dr. Luyten. More than 80% of the 205 known white dwarf stars have been discovered by Dr. Luyten and his associates during the last decade or so.

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ELECTRONICS

TV Piped in to Residents Of New Hampshire Town

► THE OLD joke about piping sunlight into towns nestled deep within mountains is more fiction than fact. But when it comes to television, that is a different story.

Such a television piping system is now in effect in Laconia, N. H., so that residents can receive video programs that are otherwise blocked by mountains. A 40-foot antenna placed on top of Mount Belknap

scrapes the sky at an elevation of about 2,400 feet and can pick up TV signals from Boston 120 miles away.

More than 30,000 feet of coaxial cable carry the received signal from the mountain top to residents below. Five amplifiers scattered along the 40-pole route boost the signal as it goes by.

Although Laconia is not the first town to pipe video in from a nearby mountain, it is the first New England town to use the RCA Antenaplex system. Laconia's TV pipeline is owned and operated by Community T-V Corporation.

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SCIENCE NEWS LETTER

VOL. 62

JULY 12, 1952

No. 2

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N St., N. W., Washington 6, D. C., North 2255. Edited by WATSON DAVIS.

Subscription rates: 1 yr., \$5.50; 2 yrs., \$10.00; 3 yrs., \$14.50; single copy, 15 cents, more than six months old, 25 cents. No charge for foreign postage.

Change of address: Three weeks notice is required. When ordering a change please state exactly how magazine is now addressed. Your new address should include postal zone number if you have one.

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Printed in U. S. A. Entered as second class matter at the post office at Washington, D. C., under the act of March 3, 1879. Acceptance for mailing at the special rate of postage provided for by Sec. 3440, P. L. and R., 1948 Edition, paragraph (d) (act of February 28, 1925; 39 U. S. Code 283), authorized February 28, 1950. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to periodical literature, Abridged Guide, and the Engineering Index.

Member Audit Bureau of Circulation. Advertising Representatives: Howland and Howland, Inc., 393 7th Ave., N.Y.C., Pennsylvania 6-5566, and 360 N. Michigan Ave., Chicago, State 2-4822.

SCIENCE SERVICE

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BIOCHEMISTRY

New Growth Vitamin Discovered in Liver

► A NEW vitamin, or "growth factor" in liver, has been discovered by Dr. John Yudkin of King's College of Household and Social Science, the University of London, England.

Apparently normal, healthy children fed a beef liver powder specially prepared by Dr. Yudkin gained in 13 weeks about one-fourth inch in height and 10 ounces more in weight, on the average, than a control group of healthy two-year-olds. The gains, in this short period of time, figure out to 20% and 40%, roughly, more than those of the normal children without the liver preparation.

The boys and girls, from four day nurseries in London, were of average height and their weight was up to standard at the start of the test. They got the liver preparation in orange-flavored chocolate bars, one bar every day during the five days each week they were at the nursery. Identical bars, but without the liver, were given to about an equal number of children as a control on the experiment.

Dr. Yudkin does not believe the factor in the liver responsible for the significant gains in height and weight is vitamin B-12. He is not sure whether it is in all preparations of liver. He is trying now, he states in his report to the *BRITISH MEDICAL JOURNAL* (June 28), to determine the distribution and nature of this apparently new growth factor.

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TECHNOLOGY

Bees Give Clue To Building Material

► TAKING A tip from bees, engineers have developed a new lightweight construction material that may help house-builders cut costs.

The material, called Cyclecore, has a honeycomb-like impregnated paper filling sandwiched between sheets of metal, wood, plastic or asbestos cement. The filler and "skins" are bonded by a tough adhesive.

Developed as paneling by the Chrysler Corporation, the material has not only exceptional strength, but also good insulating qualities. A four-inch-thick panel insulates as well as a two-foot-thick masonry wall.

Because of its light weight, 20% to 25% savings could be made in structural steel framing, and 15% to 20% savings could be obtained in roof beams and bar joists, the engineers report. Furthermore, as much as 30% could be saved in reinforcing steel used in foundations, and 15% less steel would be required in lintels and anchors of buildings using the material.

Primarily the panels are for interior building partitions, but field tests have pointed to numerous exterior uses for them.

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ARMY'S NEWEST TANK—The Patton 48, the most modern medium tank, has a one-piece, cast-armor hull and improved firepower to make it a formidable fighting machine.

TECHNOLOGY

Medium Tank Foils Shells

► SLINKY AND low-down, with an armor hide that shells glance off, the Army's newest medium tank, the Patton 48, has now been unveiled.

It can cross water four feet wide, climb a three-foot wall, negotiate an eight-foot trench, rush up a steep grade and zig-zag bafflingly.

This war machine has been coming off the production line at the Chrysler Delaware Tank Plant for the last two and a half months.

For the first time a one-piece cast hull has been achieved and this is elliptical in shape to make it difficult for an enemy shell to bite into it. The turret is also in one piece, with sloping, elliptical sides to give greater protection and greater vision to the crew.

The main gun is a new high velocity 90-millimeter, with a quick change tube. Mounted coaxially with it, are .50 and .30 caliber machine guns. Its engine is a V-12 air-cooled job made in New Orleans, developing 810 horsepower.

There is a crew of four, one less than for previous Patton tank models. Its fighting compartment is described as more spacious than any previous model.

In many respects the Patton 48 is almost identical with the M-47, its predecessor and an interim model that had many experimental features. Both have the same motor and the same optical range finders for laying the gun quickly and accurately on targets, although the Patton 48's mechanism is somewhat simpler.

The Patton 48 also is equipped with a cross-drive transmission. This transmission, coupled with power steering, practically nullifies driver fatigue. World War II tank

drivers, after a few hours, became so fatigued that combat efficiency was lowered.

The tank is named for the late Gen. George S. Patton, World War II commander and a leading exponent of armor.

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ZOOLOGY

Whale Hair Wanted To Complete Collection

► IF ANYONE has any whale hairs, Dr. Leon A. Hausman would like to have them to add to his collection which contains over 2,000 specimens of hair, but none from whales. Even the 100-ton variety of whale has only a few which are located around the animal's mouth.

Dr. Hausman, professor of zoology at New Jersey College for Women, Rutgers University, told Watson Davis, director of *SCIENCE SERVICE*, on his "Adventures in Science" program over the CBS Radio Network that his interest in hair began when he was assigned as his subject for his doctoral thesis the comparison of his own hair with that of a 5,000-year-old Egyptian mummy. Since that time, Dr. Hausman has lent his knowledge on hair to the law courts, government, museums and industry.

Hair varies from animal to animal and between human types. In a law court it may be as important as fingerprints in arriving at a verdict. With the aid of his microscope, Dr. Hausman can tell if hair has been bleached or dyed and how many times, and he can tell if your fur coat is a real mink or a skilful imitation.

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PHYSIOLOGY

Evaluate Body's Salt Needs

Warn about taking care in amount of extra salt consumed during hot spells, as body adjusts to high temperatures after a few days.

► IF YOU take extra salt during hot weather, be careful not to overdo it. It is easy to take too much.

Dr. Sid Robinson, professor of physiology at Indiana University, Bloomington, who has for several years studied the loss of salt through perspiration, finds that exhaustion from loss of salt is possible for only a few days after the beginning of exposure to high temperatures. After that, the body becomes acclimatized, and the amount of salt in sweat is automatically lowered.

This reduction is brought about by a hormone produced by the adrenal cortex gland, when the gland gets the signal that the salt in the body is getting low. Thus, in the first heat of summer, you'll lose a lot of salt for a few days, then your body automatically cuts down on salt excretion through the sweat glands and kidneys.

Dr. Robinson says the average person should drink a salt solution, made by putting one-fourth teaspoon of salt in a glass of water, every day for the first three or four days of a heat wave. Taper this off for the next six or seven days, then forget it.

The stomach disturbances some people get from salt tablets can usually be avoided,

he says, by crushing the tablets and dissolving them in water. He emphasizes that a water deficiency is just as debilitating as a salt deficiency.

Dr. Robinson's studies show that skin temperature affects the amount of salt in sweat—the higher the temperature, the greater the salt content. He therefore believes that workers in very high temperatures, such as are found around boilers and blast furnaces, should take extra salt regularly.

In his research, financed by the U. S. Public Health Service, Dr. Robinson has conducted hundreds of tests on Indiana University medical student volunteers. They have sweated long hours walking and running on a treadmill, which was tilted so that they were actually toiling uphill.

The treadmill is installed in a room in which air movement, temperature and humidity can be held constant. Elaborate precautions are taken to assure accurate measurement of all salt lost by the men during the experiments, and of the salt they consume. Detailed records are made of the subjects' heart rates, circulation, blood chemistry, respiration and body temperatures.

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CHEMISTRY

Coal Yields Chemicals

► THE HYDROGENATION process of making synthetic liquid fuels from coal may be applied during the years while petroleum is plentiful principally to the production of coal chemicals, not gasoline. The process originated in Germany but was highly improved in America during the postwar years.

Until now, the principal chemicals obtained from coal, such as naphthalene, aniline, quinoline, benzene, phenol, toluene, xylene and their derivatives, have been obtained from coal as by-products in coke-making for the steel and other industries. Enough to meet present demands is not available from this source; additional quantities are essential.

The rapid growth of the synthetic rubber and the plastic industries is largely responsible for the greatly increased demand for these chemicals from coal. Insecticides and explosives are also heavy users. Besides direct applications of these basic chemicals, they are the sources of perfumes and drugs and many widely used other products.

The market for coal chemicals has been expanding at a rate of about 30% each year during the past decade or so, while the coke oven yield has increased only about five percent. Part of the increased demands is being met by similar chemicals from petroleum.

At Institute, near Charleston, W. Va., an \$11,000,000 plant is now producing coal chemicals from coal by the hydrogenation process. It was built and is operated by the Union Carbide and Carbon Corporation and is said to be the first plant in the world for producing chemicals that uses coal as a direct raw material.

Pittsburgh Consolidation Coal Company may soon have a somewhat similar plant to get chemicals from coal, but one of the principal products planned is a residue known as char. This solid fuel is entirely suitable for fuel in industrial plants and has a heating value of about 70% of the coal from which it is made.

In the process proposed each ton of high-volatile coal processed would yield from 30

to 40 gallons of liquid and about 1,000 cubic feet of good quality heating gas. The liquid and gas can be converted into synthetic fuels instead of being used as a source of chemicals if a shortage of petroleum warranted the change.

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PUBLIC HEALTH

Rule to Beat Heat—Do Not Talk About It

► FOR BEATING the heat during very hot weather:

1. Wear loose fitting clothing of porous or mesh weave. This lets the heat of your body escape, lets any cool air through.

2. Eat your normal, nourishing diet. Cold foods and beverages are more tempting. Be sure you get the protein, from meat, poultry, fish, eggs, milk or cheese, and the calories your body needs regularly.

3. Rest, even if you cannot sleep, a full eight hours at night. See that the children get a mid-day rest even if they do not sleep.

4. Bathe or sponge-bathe the babies, children and yourself more often for extra comfort.

5. Stop talking about the heat and watching the thermometer. You will feel cooler if you keep normally busy and forget about keeping cool.

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ENTOMOLOGY

Locust Plague Controlled For First Time in History

► "FOR THE first time in history a locust plague is being kept under control," Kenneth C. Smith of the Department of State's Technical Cooperation Administration told SCIENCE SERVICE.

Cooperation of many countries, including the United States through Point Four, is making the powerful and so far successful attack on the swarming insect pests possible. Operations in Iraq are now complete and battle lines have now moved to Iran, where the infestation is very severe, a recent cable from Baghdad states.

There has been no damage from locusts on winter crops in Iraq and only a negligible amount on summer crops and no further infestation or damage is expected.

In Iran, as in Iraq, local authorities direct the overall attack, basing it on the usual method of scattering poisoned food bait by ground crews, motor equipment and airplane. Other nations cooperate by loaning equipment and trained personnel.

Object is to attack the locusts wherever they breed, thus preventing swarms of the next generation from reaching cultivated areas. The locust lays its eggs in the ground in pods containing about 70 eggs. After two or three weeks, the eggs hatch and the hoppers emerge. These grow rapidly and feed voraciously, causing very severe damage to crops.

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MEDICINE

Home Care in Polio

During present infantile paralysis season, doctor suggests that many patients be treated at home where they "might be better cared for."

► MANY PATIENTS during the present outbreak of poliomyelitis will be taken care of at home instead of being rushed to a hospital, if doctors and parents follow the views of Dr. Philip M. Stimson of the pediatrics department of the New York Hospital-Cornell Medical Center, New York.

His views, originally reported to an area meeting of the American Academy of Pediatrics, are given in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (June 28) to reach physicians all over the country at this time.

Most patients with suspected polio, with nonparalytic forms, and many with mild forms of the disease "might better be cared for at home," he believes.

"First and foremost" among the advantages of home care of the polio patient, he points out, is the important fact that the patient is saved the fatigue, excitement and nervous tension of the trip to the hospital and the "excessive handling" that usually goes on during the first days in a hospital.

Dr. Stimson stresses this because polio authorities agree that fatigue and exhaustion at the onset seem to aggravate the ravages of the disease.

Other advantages he gives are: Most parents prefer to have their sick child at home. There is much less emotional disturbance in the family and the child. Financial costs

are less. Hospital beds and nurses are freed for more serious cases of polio and other diseases. The family doctor, who has the confidence of the patient and the family, can remain in touch with his patient.

The rest of the family and neighbors are not endangered because by the time polio is suspected, they have already been exposed and infected so there is little or no danger from further exposure. The patient should be kept in his own bed in his own room, of course.

A firm mattress, a footboard for keeping the weight of bed-clothes off his legs, a quiet environment, moist heat and aspirin to relieve backaches and general tenderness can be given the patient at home as well as in the hospital.

Health departments should be ready to help the family doctor with diagnostic aid, visiting nursing and physical therapy.

If the home cannot provide adequate facilities for the care of the patient, if there is no one to give him proper treatment and nursing, or if the family is emotionally unstable, the patient with even a mild form of the disease had better be taken to the hospital.

Other definite indications for hospitalization given by Dr. Stimson are: increasing elevation of temperature; the fact that the patient "looks sick" and is getting sicker; urinary difficulties; some weakness in a

large triangular muscle covering the peak of the shoulder which may be followed by breathing difficulty; nasal regurgitation and voice change if persistent; and particularly any difficulty in swallowing.

Science News Letter, July 12, 1952

METEOROLOGY

Hot and Dry July In Central Plains

► THE GREAT cattle- and grain-producing heart of the nation will be hot and dry until the end of July. This is the prediction of the Weather Bureau's Extended Forecast Section.

Temperatures will "average a few degrees above seasonal normal over most of the nation," according to the long range forecasters. In the Pacific Coast states, the Southeast and from the upper Great Lakes eastward through New England, near normal temperatures can be expected.

Hottest, as compared with normal July weather, will be in the central plains states. Except for the central plains, the country will have about the usual amounts of rain.

This weather will be the result of a continuation of the backward weather experienced last month. The general weather patterns are continuing to move from east to west instead of from west to east.

Science News Letter, July 12, 1952

PSYCHOLOGY

Good Labor Mediator Has Neutral Attitude

► A GOOD labor-management mediator has a neutral attitude, favoring neither labor nor management.

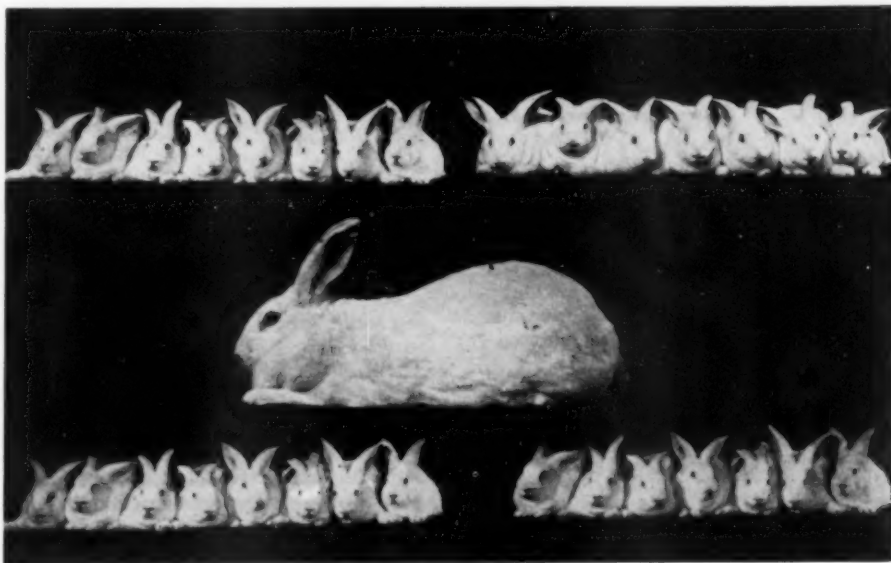
Dr. Irving R. Weschler of the Institute of Industrial Relations at the University of California at Los Angeles has studied the personality patterns of 146 labor mediators. Participating in his study were members of the Federal Mediation and Conciliation Service and persons in the New York and California state services.

Each was asked to rate all the others participating in the study on the basis of his impression of their work, both by personal knowledge and reputation.

These ratings of "good," "poor," and "other," served to determine if other tests subsequently given the mediators were successful in differentiating them on the basis of intelligence and impartiality and other factors. A personality test failed to yield significant data. In addition, biographies of the individuals were studied to find, if possible, variables that might account for a "good" or "poor" rating.

A new indirect method of attitude measurement, called the error-choice technique, resulted in a high percentage of "good" mediators falling within the so-called neutral zone. On the other hand, all mediators rated "poor" by their colleagues were found to be either pro-labor or pro-management in the attitude test.

Science News Letter, July 12, 1952



ONE YEAR'S OFFSPRING—A New Zealand White doe and her fryer production for 12 months. More than 40 million pounds of rabbit meat are consumed annually in the U. S. (See p. 28.)

TECHNOLOGY

Unlighted Signs Glow In Automobile Headlights

► UNLIGHTED SIGNS that show up well both during the day and after dark are making highways safer. At night they glow in the distance when bright automobile headlights shine on them.

Glass, plastic and shiny metal in various shapes and forms are being used to call a driver's attention to hazards by reflecting the car's own bright lights back to the driver.

Little glass spheres make the white line marking the center of the road much more visible at night when even a dim light strikes it. Shiny little lenses molded in plastic reflect light right back to its source, making a sign visible in the far distance.

Automobiles and trucks, bicycles and trains are being marked with some type of reflector so that the lights of an approaching car can easily spot them in the dark. Pedestrians walking at night are urged to protect themselves by carrying some kind of reflective material.

Typical reflective materials used to increase the night-time visibility of highway markers have been collected for you by SCIENCE SERVICE. Reflecting beads used to make paint more visible, fabric and sheeting made reflective by the addition of thousands of little glass spheres, and a plastic reflector with a multitude of shiny little cube corners are included in the Highway Safety kit, available for 75 cents. Just write SCIENCE SERVICE, 1719 N St., N.W., Washington 6, D. C., and ask for the Highway Safety Kit.

Science News Letter, July 12, 1952

ASTRONOMY

Radio Telescopes Show Charged Particles' Speed

► THE CHARGED particles that cause sudden outbursts of hisses, swishes and grinding noises on ultra high frequency radio sets are very tiny indeed.

There are about a hundred million of these electrons and protons in each cubic centimeter when they leave the sun on their trip toward the earth, calculates Dr. Hari K. Sen of the National Bureau of Standards.

Violent magnetic storms here on earth give us some clue to the speed and density of these particles when they reach the earth. But it is the recently developed radio telescopes, specially designed to pick up static from the sun, that are now showing astrophysicists how these particles act even before they leave the sun, Dr. Sen reported to the joint meeting of the American Astronomical Society and the Astronomical Society of the Pacific in Victoria, B. C.

The first direct evidence of the speed of these charged particles before they leave the sun has been furnished by Australian radio astronomers, Dr. Sen reported. By

interpreting their findings as evidence of radio waves being generated by solar material moving through the sun's outer envelope, he obtained an independent method of estimating the density and motion of the particles in the solar atmosphere.

These tiny charged particles move about within the sun's atmosphere at a speed of some 300 miles a second, Dr. Sen estimates. But they are speeded up in the sun's outer atmosphere, so they are traveling much faster when they leave the sun on their journey toward the earth.

They are also spread farther apart, so that there are about a thousand particles in each cubic centimeter when they reach the earth. Theories of magnetic storms on the earth also indicate approximately these velocities and densities.

Science News Letter, July 12, 1952

ENTOMOLOGY

Find New Proturan Species in South America

► A NEW species of proturan, one of earth's most primitive insects, has been found in South America, Miss Grace Glance of the Smithsonian Institution has reported.

Proturans are blind, wingless, very tiny creatures found under bark and in leaf litter. They are believed to represent one of the earliest stages in the evolution of insects.

Since the proturans are so very small and hide themselves so well, few kinds of this insect are known to entomologists. Adults of the new species, the second kind to be found in South America, are less than one-fourth of an inch long and dark yellow in color.

Sluggish and slow-moving, proturans have three pairs of legs, but only two of the pairs are used for locomotion. The front pair is held up in front of the insect as it moves. These legs apparently serve the purpose of the antennae found in all higher insect orders, and are provided with primitive sense organs of touch.

Science News Letter, July 12, 1952

GENERAL SCIENCE

NSF Grants Aid Small College Research

► RESEARCH IN small colleges throughout the nation is being supported by 29 grants, totaling \$263,535, announced by the National Science Foundation.

Although the 29 projects in the biological and physical sciences were selected primarily on the basis of merit, the Foundation is trying in its research support program to encourage research in smaller institutions.

The current awards were the final grants for the fiscal year 1952. During the year 98 basic research grants were distributed to 60 institutions in 35 states and Hawaii. The average award was about \$5,800 per year.

Science News Letter, July 12, 1952

IN SCIENCE

PHYSICS

A-Bomb Uranium Purifies Rare Gases

► THE A-BOMB element, uranium, has a new peacetime use. Rare gases can be purified by using a uranium powder more effectively and conveniently than by any other method, two scientists at Johns Hopkins University, Baltimore, have reported in the JOURNAL OF THE OPTICAL SOCIETY OF AMERICA (June).

Drs. G. H. Dieke and H. M. Crosswhite found uranium hydride can be used to eliminate impurities released from electrodes or walls of vessels such as rare-gas discharge tubes. Such impurities often make it impossible to obtain significant measurements.

Uranium hydride is heated to about 400 degrees Centigrade to drive off the hydrogen. Then the rare gas is admitted. Since the uranium reacts with practically every gas except rare ones like helium, argon, neon, etc., the impurities are absorbed.

A sealed-off iron hollow cathode discharge tube previously became contaminated in two days. But, after adding activated uranium, the tube has remained pure for more than five months of constant use.

Science News Letter, July 12, 1952

INVENTION

Fuel Injection System For Rocket Patented

► YOUR FIRST flight to the moon may be safer as a result of a recent patent. It is a fuel injection system so designed that an explosion of the fuel large enough to be dangerous will not occur.

Rockets begin to move when a propellant, such as hydrogen peroxide, and a catalyst, such as calcium permanganate, are forced together by compressed air into an enclosed reaction chamber. The catalyst turns the propellant into gas, which escapes out a nozzle, thus propelling the rocket forward.

If too much propellant gets into the reaction chamber before the catalyst arrives, the rocket may be wrecked by an explosion in the chamber.

An actuating means has been included in the rocket motor that allows the compressed air to go to the propellant chamber only when the compressed air has gone into the catalyst chamber and has driven enough catalyst into the reaction chamber.

The inventors are Frank B. Halford, Edgware, Arthur V. Cleaver, London, and Ernest B. Dove, East Barnet, England. They assigned their patent, number 2,601,607, to the De Havilland Engine Company, Ltd.

Science News Letter, July 12, 1952

SCIENCE FIELDS

MEDICINE

Chemical Helps Stop Seizures of Epileptics

► AMMONIUM CHLORIDE, a chemical best known for its use in tinning soldering irons, reduces and sometimes eliminates seizures of epileptics. The usual doses of phenobarbital or Dilantin must be used with the chemical, Drs. Fritz Kant and Warren E. Gilson of the University of Wisconsin Medical School reported in Madison.

Epileptic seizures may be the result of damage or irritation to some area of the brain or may occur without known cause. Doctors have known for years that drugs like phenobarbital or Dilantin cut down the activity of the central nervous system and help prevent seizures. They also have known that keeping a patient dehydrated and maintaining a relatively acid condition in his body are other helps.

Keeping the acid condition by diet and the low allowable limits for intake of fluids and salt, however, made long-range treatment nearly impossible.

Drs. Kant and Gilson chose ammonium chloride as a drug having the needed dehydrating and acidifying effect. The two scientists have not had a single case that has not shown some improvement in nearly two years of clinical research. Epileptics who have never responded satisfactorily to any other treatment have found happier, more normal lives because of the ammonium chloride treatment.

Science News Letter, July 12, 1952

NUTRITION

Cereals and Milk Are Efficient Protein Mixture

► "CEREALS AND milk go together," Dr. E. B. Hart of the University of Wisconsin stressed in a report in NUTRITION REVIEWS (May).

He is disturbed because recent findings on the biological value of various proteins have been misinterpreted in some quarters.

The biological value of proteins depends on their content of essential amino acids and "possibly," he says, on the rate of release in the digestive tract of these acids. Wheat, corn, rye and barley contain proteins low in one of the amino acids, lysine.

If cereal grains constitute the sole article of diet, the protein alone, irrespective of other deficiencies, could not support normal growth of an animal. This has been known for 50 years.

For more than 40 years, scientists have known that cereal grain proteins had to be supplemented with the "better and more efficient proteins of milk, meat or eggs," Dr. Hart points out.

One part by weight of a cereal plus one part by weight of milk will give an efficient protein mixture, he states. Since few persons weigh their food, one can measure by volume, for example, a cup of cereal plus a cup of milk. This proportion applies to any cereal.

Muscle meat, such as steak or roast, glandular organs such as kidneys or liver, and eggs are also excellent protein supplements to the cereal proteins. But in the United States, Dr. Hart observes, they are less likely to be used in the case of young growing animals or children.

So, he warns, do not be misled into thinking cereal breakfast foods are inferior or that one of them is any better in protein value than another. Breakfast cereals, he points out, are eaten with milk, only rarely with water alone. Any differences in the biologic value of their proteins is wiped out if they are eaten with the proper proportions of milk, that is, 1:1 by weight.

Science News Letter, July 12, 1952

VETERINARY MEDICINE

Overweight Parrots Have Health Problems

► OVERWEIGHT IS a common health problem among pet parrots as well as humans, Dr. David L. Coffin of Angell Memorial Animal Hospital, Boston, declared at the meeting of the American Veterinary Medical Association in Atlantic City, N. J.

Polly the parrot may also get hardening of the arteries, arthritis, and the bone disease, osteomyelitis, as well as diet deficiency diseases. She can catch tuberculosis from her owners, too.

In reverse, parrots and birds of the psittacine family, such as parakeets, may give psittacosis to their owners. But many other birds, probably any bird, can spread this disease, Dr. Coffin warned. He mentioned specifically pigeons, turkeys, chickens, ducks, fulmars and gulls.

Science News Letter, July 12, 1952

MEDICINE

MS Patients Told to Emphasize the Positive

► EMPHASIZE THE positive is, in effect, the advice given to MS, or multiple sclerosis, patients in four new manuals written for them by Dr. Edward E. Gordon, medical director of the Institute for Crippled and Disabled, New York.

"You still have a lot more ability than disability," he states.

The manuals, first of their kind ever printed, are published by the National Multiple Sclerosis Society. They will be distributed through physicians to four kinds of patients: 1. independently ambulatory patients; 2. patients ambulatory with aids; 3. wheel chair patients and 4. more confined patients.

Science News Letter, July 12, 1952

ELECTRONICS

Radio Forecasts to Be Broadcast Twice Hourly

► RADIO HAMS and others using short-wave radio equipment are now able to tune in on a forecast of whether reception of broadcasts originating on the other side of the Atlantic Ocean will improve or get worse for the next 12 hours.

Starting July 1, the National Bureau of Standards began broadcasting new short-wave radio disturbance forecasts via the NBS standard frequency broadcasting station WWV. Prepared four times daily, these forecasts are transmitted in Morse code twice each hour on WWV standard frequencies of 2.5, 5, 10, 15, 20 and 25 Megacycles.

During the past six years the letters "N," "U" and "W" have signified current conditions as normal, unsettled or disturbed. Now a digit has been added to the number. The digit 1 warns that broadcasts cannot get through at all for the next 12 hours, 5 shows fair reception and 9 indicates that reception will be excellent.

Designed specially to show reception of broadcasts from London to New York, broadcasts originating in Moscow may be expected to be a bit more disturbed, those from Paris or Tangiers will normally come through more clearly.

The forecasts are issued at 19½ and 49½ minutes past the hour. They are based on reports about sunspot development, solar eruptions and other activities on the sun obtained from a world-wide network of geophysical and solar observations.

Science News Letter, July 12, 1952

VETERINARY MEDICINE

Newcastle Disease Not Spread by Sparrows

► SPARROWS CAN get Newcastle disease but they are "probably of little importance" in spreading this serious poultry disease, Dr. Donald P. Gustafson of Purdue University Agricultural Experiment Station declared at the meeting of the American Veterinary Medical Association in Atlantic City, N. J.

He found that English sparrows could get the disease by breathing an aerosol containing its germs and by contact with infected sparrows. But under conditions like the natural one in which sparrows frequent hen houses, the sparrows did not catch the disease from chickens, although exposed to chickens 90% of which died of the disease.

Atomized vaccine of the B-one strain of Newcastle virus blown into the poultry house gives best results in protecting birds three weeks old and older, Drs. S. B. Hitchner and G. Reising of the Massachusetts Agricultural Experiment Station report. The method may also be suitable for younger chicks, they said, but they have not yet tried it with young birds.

Science News Letter, July 12, 1952

CRYOGENICS

Conquer Low Temperatures

Although absolute zero never can be reached, scientists have pushed the temperature to within 15 ten-thousandths of a degree above the lowest limit.

By ALLEN LONG

► EVEN IN all this summer heat, you probably shiver at the thought of such chilly temperatures as 20 degrees below zero. But to scientists who, with modern machines, have pushed the temperature within a fraction of absolute zero, a mere minus 20 degrees is hot.

Absolute zero, you may recall from your school days is the rock bottom of temperature scales. Bitter arctic weather may drop the thermometer to minus 70 degrees Fahrenheit. Absolute zero is about six and a half times colder, numerically speaking.

According to the classical definition, no heat remains at absolute zero. But actually scientists believe that some heat does exist at that temperature. Heat causes molecules of a substance to vibrate. The hotter the substance is, the more agitated its molecules become.

As a rule, when the molecules reach a certain degree of agitation, the substance melts. When they reach another degree, the substance shoots some of its molecules off, like steam evaporating from water.

Scientists have observed substances at extremely low temperatures. They now believe it quite likely that a substance's molecules would vibrate at absolute zero although, according to the classical definition, no molecular motion should exist.

Unobtainable Temperature

But scientists never will be able to demonstrate that the molecules are still in motion after a substance has been cooled to absolute zero. That is because a basic law of heat theory says the absolute temperature never can be reached.

With such devices as the Collins Helium Cryostat and powerful electromagnets, scientists can push the temperature almost to absolute zero, but the closer they come to their goal, the harder it is for them to go farther on down.

The Collins Helium Cryostat is one of the refrigerating machines that made very low temperatures available in many laboratories which could not afford former refrigerating equipment.

Named after its designer, Dr. Samuel C. Collins of the Massachusetts Institute of Technology, the machine will condense and chill helium to temperatures within one or two degrees Kelvin of absolute zero. In part it uses helium as "steam" to operate a piston-driven motor. The moving parts are oiled with gaseous helium because ordi-

nary oil would freeze at those temperatures.

The Kelvin scale offers a convenient way to express temperatures. The zero of the Kelvin scale is absolute zero. On the Centigrade scale, however, the zero mark represents the point at which water freezes. On the Fahrenheit scale, zero represents the lowest temperature that Gabriel D. Fahrenheit could obtain by mixing sea-salt and ice.

Success in liquefying oxygen in 1877 provided the stimulus which drove scientists to seek the liquefaction of other gases such as nitrogen and hydrogen.

As time wore on, the atomic theory was proposed and scientists began wanting to reach low temperatures so they could study the behavior of matter in that unexplored area of physics.

At present, the record low temperature unofficially is held by Dr. Dirk DeKlerk, formerly of the Kamerlingh-Onnes Laboratory at the University of Leiden in Holland. He was assisted by Prof. C. J. Gorter and M. J. Steenland.

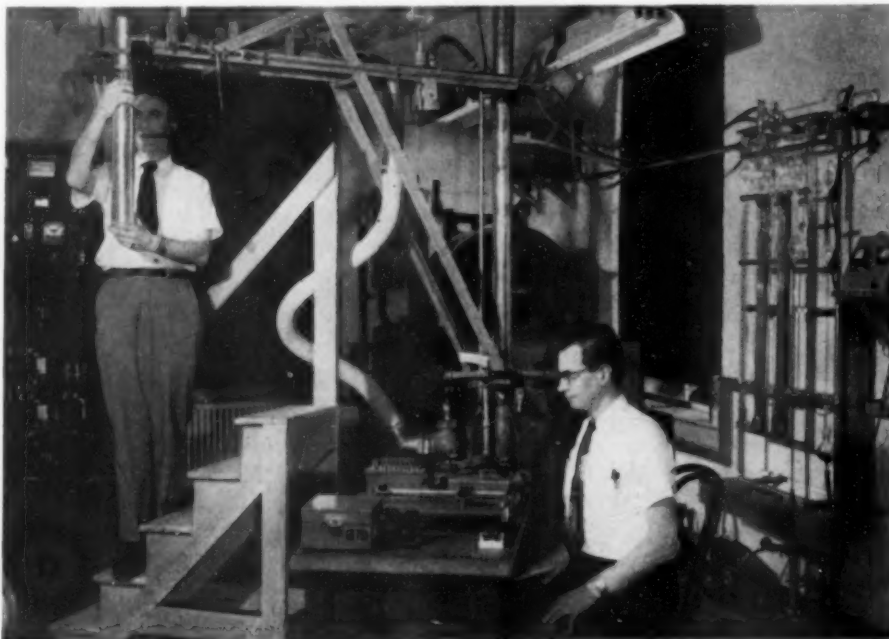
Dr. DeKlerk, now working in the cryogenics (low temperature) laboratories at the National Bureau of Standards, succeeded in reaching a temperature of only 15 ten-thousandths of a Kelvin degree.

He obtained that temperature by using adiabatic demagnetization, a process previously tried by other men. A paramagnetic salt was chilled by conventional supercooling processes until it was within a degree or so of absolute zero. Then it was placed in the field of a powerful electromagnet.

When the magnet was turned on, its strong field "established order in the molecules of the substance," he explained. That literally squeezed heat out of it.

After the heat had been carried away by the refrigerating system, the magnet was turned off and the low temperature had been reached. Dr. DeKlerk says some day the temperature probably will be pushed even lower.

Although the National Bureau of Standards low-temperature research workers would like to set an even lower record, at present that is not their goal. Currently they are searching for better ways to measure the extremely low temperatures, since mercury, alcohol and gas thermometers are unsatisfactory at those temperatures.



PLUNGING TEMPERATURES—Dr. R. P. Hudson makes a final adjustment of the liquid helium bath attached to the National Bureau of Standards' new "gallows." The apparatus, which contains a salt of chrome alum, will be swung into the field of an electromagnet for chilling to temperatures near absolute zero. Dr. D. DeKlerk prepares to measure the temperature of the substance.

The layman probably asks himself occasionally why scientists work so hard on something for which no immediate application is seen. The answer, of course, is that future undreamed-of applications may come along.

Some day rocket ships will be exposed to temperatures in the realm of absolute zero when they penetrate space. And if you are a passenger aboard that ship, you probably will be glad to know that the design engineers knew the rocket ship's metal body would work properly out there where it would be disastrous for something to go wrong.

Strange Reactions

As various substances were chilled to temperatures closer to absolute zero, they sometimes acted strangely. Helium gas became liquid at 4.2 degrees Kelvin, and it acted just like violently boiling water.

But when the temperature was lowered to 2.19 degrees Kelvin, a strange transfiguration came across the turbulent surface of the liquid. The surface became as smooth as glass. And then helium went haywire.

Defying gravity, it climbed up walls of the vessel holding it. It seeped through microscopic cracks in its container as if they were open doorways. If a test tube was

thrust into it, the helium would climb into the test tube and fill it to a level equal to that in the container. If the test tube was removed, the helium climbed back out.

Scientists saw that was a new and distinct state of helium which had not been predicted. They called it "Helium II," and they called the turbulent, boiling liquid "Helium I." They called the strange gravity-defying flow of Helium II "superfluidity" because no apparent friction existed in the liquid.

Nor was helium the only substance that reacted strangely in the realm of absolute zero. Other materials astonished scientists by displaying some odd characteristics of their own.

When some metals were placed in liquid helium, an electric current induced in a closed ring of the frigid metal continued to flow for hours, even days, without stopping after the current source had been removed.

The apparent lack of electrical resistance violated all the rules for current flow at usual temperatures. Under normal conditions, current induced in a closed ring of metal stops almost instantly when the source is removed.

Scientists call that condition "superconductivity." They hope to find a practical use for it sometime in the future.

Science News Letter, July 12, 1952

PUBLIC HEALTH

Do's and Dont's for Polio

► IF POLIO, short for poliomyelitis, or infantile paralysis, is in your community, here are some do's and don'ts suggested by the National Foundation for Infantile Paralysis:

1. Do let the children continue to play and be with their usual companions. They have already been exposed to whatever polio virus may be in that group and may have developed immunity to it.

2. Do teach the children to scrub their hands before putting food in their mouths.

3. Do see that the children never use anybody else's towels, wash cloths, or dirty drinking glasses, dishes and tableware.

4. Do follow your doctor's advice about nose and throat operations, teeth extractions and inoculations during polio season.

5. Do watch for signs of polio, such as headache, fever, sore throat, upset stomach, tenderness and stiffness of back and neck.

6. Do call the doctor at once if such symptoms develop and put the patient to bed away from other members of the family.

7. Don't let the children mingle with strangers, especially in crowds, or go into homes outside their own circle. There are three different viruses that cause polio. Your children's group may be immune to one. Strangers carry another to which they are not immune. Being immune or having immunity means protection.

8. Don't let the children become tired or chilled. Overtired or chilled bodies are less able to fight off polio.

9. Don't take the children away from your home community without good cause. Polio time is the time to stay at home and keep with everyday companions.

If polio strikes your home, have confidence in your doctor. Call him early. The earlier the care, the better the chances for complete recovery. The child who gets polio has a better than even chance to recover without paralysis.

For more information or help, including financial help, get in touch with your local chapter of the National Foundation for Infantile Paralysis.

Science News Letter, July 12, 1952

MEDICINE

Zirconium Ointment Is Poison Ivy Remedy

► HERE IS good news for poison ivy victims: Now you can get the anti-poison ivy chemical, zirconium, in an ointment with the itch-relieving anti-histamine, Pyribenzamine. (See SNL, Aug. 25, 1951, p. 115.)

This combination, made by Ciba Pharmaceutical Products, is now on the market, and you will not need a prescription to get it from your drug store.

The zirconium in the ointment neutralizes the poison ivy poison, which is an oily material called urushiol.

Science News Letter, July 12, 1952

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THE BEST LOVED TREES OF AMERICA: Intimate Close-Ups of Their Year-Round Traits—Robert S. Lemmon—*American Garden Guild and Doubleday*, 254 p., illus., \$3.50. The biography of your favorite tree as well as many others, with beautiful photographs showing bloom, leaf, bark and complete form.

EFFECTS OF CERTAIN METHODS OF FEEDING AND MANAGING RABBITS IN COMMERCIAL FRYER PRODUCTION—George S. Templeton—*Govt. Printing Office, USDA Circular No. 901*, 16 p., illus., paper, 10 cents. More than 40,000,000 pounds of rabbit meat are consumed annually in the U. S. Fryers are preferred.

EXCHANGE OF PERSONS: The Evolution of Cross-Cultural Education—Guy S. Metraux—*Social Science Research Council*, 53 p., paper, 50 cents. Tracing the custom of studying abroad back to the days of the Romans.

FERROMAGNETIC PROPERTIES OF METALS AND ALLOYS—K. Hoeselitz—*Oxford University Press*, 317 p., \$8.00. Selection of the material for this book has been determined by the needs of the author in his own work.

FIX YOUR FORD: V8's and 6's 1932 to 1952—Bill Toboldt—*Goodheart-Willcox*, 208 p., illus., \$2.50. The editor of Motor Service Magazine tells you how to save money by getting more gasoline and tire mileage and by doing many repair jobs for yourself.

A HEALTHY PERSONALITY FOR YOUR CHILD—Children's Bureau—*Govt. Printing Office, Children's Bureau Publication No. 337*, 23 p., illus., paper, 15 cents. Counseling parents on how to give their children security and normal development.

AN INTRODUCTION TO MODERN THERMODYNAMICAL PRINCIPLES—A. R. Ubbelohde—*Oxford University Press*, 2d ed., 185 p., \$4.25. Based on lectures delivered in the department of thermodynamics in Oxford.



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THE MANUAL OF CORPORATE GIVING—Beardsley Ruml and Theodore Geiger, Eds.—*National Planning Association*, 415 p., \$6.75. Information for business men who want to take advantage of the five percent tax deduction for contributions to the support of educational, scientific and welfare activities.

THE NATION'S LEADING HOUSE MAGAZINES: A Public Relations Guide to 1400 Major Publications Totaling 55,000,000 Circulation—*Gebbie Press*, 181 p., illus., paper, \$20.00. An alphabetical list by company issuing, an index by title and a geographical list. Material used by each magazine is presented as well as format and a halftone showing the cover.

THE ORIGIN OF LIFE AND THE EVOLUTION OF LIVING THINGS—Olan R. Hyndman—*Philosophical Library*, 648 p., \$8.75. Presenting the author's "environmental theory" which may not receive general agreement.

PRINCIPLES OF CHEMISTRY—Joel H. Hildebrand and Richard E. Powell—*Macmillan*, 6th ed., 444 p., illus., \$7.50. A college text in chemistry as it is taught at the University of California.

PROBLEMS HISTORICAL AND NUMISMATIC IN THE REIGN OF AUGUSTUS—H. R. W. Smith—*University of California Press*, 88 p., illus., paper, \$1.00. A study of a numismatic curiosity in the form of an ancient coin which may be a forgery or may be "a booby-trap for rash incredulity."

SCIENCE IN ALASKA: Selected Papers of the Alaskan Science Conference of the National Academy of Sciences, National Research Council—Henry B. Collins, Ed.—*Arctic Institute of North America*, 305 p., illus., paper, \$2.25. Complete text of 23 papers reviewing research in Alaska in all fields from anthropology to zoology.

SOIL MECHANICS FOR ROAD ENGINEERS—Department of Scientific and Industrial Research, Road Research Laboratory—*Her Majesty's Stationery Office*, 541 p., illus., \$6.75. A practical book based mainly on research by the British Road Research Laboratory during the past 15 years.

TRATADO DE ENFERMERIA TEORICA Y PRACTICA—Bertha Harmer and Virginia Henderson—*La Prensa Medica Mexicana*, Mexico City, translated from Macmillan's 4th ed., 1045 p., illus., \$6.00. Spanish translation of a text by authors at McGill University and Columbia University prepared with the collaboration of the Pan American Sanitary Bureau, under the program of the Department of State administered by Science Service.

TURKISH CROSSROADS—Bernard Newman—*Philosophical Library*, 258 p., illus., \$4.75. A writer of novels, travel books and detective stories, tells what he saw in a recent trip around Turkey.

WORLD POPULATION PROBLEMS AND BIRTH CONTROL—C. G. Hartman, Chairman—*New York Academy of Sciences*, 200 p., illus., paper, \$3.00. Papers resulting from a conference to discuss the economic and other problems of caring for greatly increased populations.

Science News Letter, July 12, 1952

MEDICINE

ACTH Aids Recovery From Delirium Tremens

► **DELIRIUM TREMENS** can be conquered and lives saved by treatment with one of the anti-arthritis chemicals, ACTH.

A group of doctors from the Fordham Hospital, Bronx, N. Y., report in the *JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION* (July 5) the case histories of two DT cases, for one of which corticotropin (ACTH) was available.

The patient who was rescued by ACTH given intravenously was in an extremely grave, moribund condition until the treatment began. He recovered in an amazingly short time, about 36 hours, after only 50 milligrams of the drug in glucose solution had been given him.

Giving of sedatives, such as paraldehyde and phenobarbital, was futile, as shown both in the case of the man who recovered and the one without ACTH therapy who died in the fourth day after being hospitalized.

The physicians, Dr. Karl Fischbach, Eunice M. Simmons and Randle E. Pollard, emphasize both the rapid effect of corticotropin given intravenously and the adequacy of small doses given in this manner. Persons in delirium tremens are suffering from not only the ravages of alcohol but also from marked nutritional deficiencies because they do not eat while drinking excessively.

Science News Letter, July 12, 1952

HORTICULTURE

New Type Lemon Picker Reduces Injury to Fruit

► A NEW type lemon picker and an improved method of picking reduce injury to fruit and cut harvesting costs, scientists in Berkeley, Calif., report.

Fruit-picking rate is increased by 30% field trials of the cutting instrument show. In terms of the 1951 lemon crop, this increase in productivity could have reduced harvesting costs by \$400,000 last year, Dr. L. E. Davis and E. P. De Garmo of the University of California, Berkeley, and Dr. R. J. Smith of the University's College of Agriculture at Los Angeles report.

The design of the clipper blades is such that as the clipper is placed on the lemon button and closed, the blades ride on the button and cut the stem off at its juncture with the fruit. This feature reduces to a minimum the defect identified as cut-buttons, once a prime cause of rejects.

Science News Letter, July 12, 1952

AERONAUTICS

Noise Complaints Reduced

► **LOW-FLYING** light airplanes equipped with noise reducers greatly cut complaints from home-owners near neighborhood airstrips, it has been shown by recent tests in the Boston metropolitan area.

The number of complaints from households near the flying fields is the basis of the conclusion. Most complaints were by telephone but complainants were later interviewed.

Ten landing strips in the region were used in the tests. Two light airplanes modified by reduction gears, four-bladed propellers and engine exhaust silencers were flown in comparison with two standard planes.

Few complaints were received of disturbing noise from the modified planes, although many neighbors got a scare because they feared the quiet planes were in trouble and making forced landings.

This noise-reducing experiment, sponsored by the National Advisory Committee for Aeronautics and carried out by Aeronautical Research Foundation of Boston, was part of an extended program of experimen-

tation with external noise reduction on light airplanes. It was designed especially to determine neighborhood reactions. A report of the work, prepared by Fred S. Elwell of the foundation, is available from the NACA in Washington.

The noise-reduction devices used on the planes were those found by extensive investigations to be effective. Airplane noises are due largely to whirling propellers and engine exhausts. The first are decreased by using four relatively short propeller blades instead of two long blades. This decreases blade-tip speed, and the resulting noise. Engine exhaust noises are reduced by mufflers somewhat similar to those used on automobiles.

Federal officials are of the opinion that the elimination of the nuisance noise of light airplanes will encourage more private flying. Neighborhood landing strips will probably become more common if the noise factor is removed. Communities now object to their establishment but would withdraw objections if the noise nuisance is eliminated.

Science News Letter, July 12, 1952

METEOROLOGY

Jet Weather Forecasts

► **QUICKER AND** better weather predictions and quicker and better information about weather above 30,000 feet were urged for safety in flying in a jet age.

Jerome Lederer, director of the Guggenheim Safety Center at Cornell University, Ithaca, N. Y., who gave the only invited paper at the three-day meeting of the American Meteorological Society, Buffalo, N. Y., said this was necessary because of the much greater speed and the much higher altitude of jet planes in flight.

He urged weather men to specialize as do physicians. Specialists in wind speeds, icing conditions, turbulence, rain and snow and the jet stream might make forecasts more accurate. He quoted Col. A. F. Merewether, American Airlines weather man, who pointed out the benefits to physicians of specialization, and added that they have a better chance of hiding their mistakes.

The jet pilot needs a much clearer picture of wind and other conditions at altitudes above 30,000 feet than he is getting today, Mr. Lederer declared. Because of the speeds at which he travels, he needs quicker reports of weather conditions at airports so that he will have time to plan an alternative landing place, if necessary.

Visibility at airports, he said, must be reported more from the standpoint of the pilot who has to make use of the reports. Conditions which make it hard to distinguish the runways from adjacent areas,

especially water, must be made known to the pilot.

Finally, communicating the reports from the weather man to the pilot must be speeded up.

Science News Letter, July 12, 1952

INVENTION

Bullet-Proof Cloth "Gas" Tank Invented

► **A BULLET-PROOF**, self-sealing gasoline tank made of silk, wool or other cloth has recently received a patent.

The gasoline tank, for use in military aircraft where weight is a big factor, is made of several layers of the cloth, glued together on the bias. Inside the cloth is a self-sealing liner, made of a material which will swell upon contact with gasoline. The swelling seals the bullet holes.

Great advantage of the cloth, according to the inventors, is that, unlike aluminum or other soft metals, a bullet will not leave jagged holes. Nor will the pressure created inside the tank by the passage of the bullet cause strains or joints or rivets. The cloth layers are overlapped and the successive layers are cut on the bias at various angles for greater strength. An adhesive, not soluble in gas, is used to bind the layers together.

The inventors are Arthur M. Howald, Perrysburg, and Leonard S. Meyer, Newark, Ohio, who assigned their patent, number 2,601,525, to Libbey-Owens-Ford Glass Company of Toledo.

Science News Letter, July 12, 1952

DENDROLOGY

Rot Fungus Threatens California's Native Palm

► **A MYSTERIOUS** fungus disease that rots the trunks is threatening California's only native palm, *Washingtonia Filifera*.

Named after George Washington, these thick-trunked trees with the broad, fan-like leaves are to be found both in native stands and domestic plantings throughout the West.

Dr. Ellis F. Darley, assistant plant pathologist of the University of California's Citrus Experiment Station, has found that more than 20 trees have recently succumbed to the trunk-rotting disease. The trunk rot has not been found yet in native stands of the palms, but has done costly damage to domestic plantings of the trees in the same area.

The fungus which causes the rot apparently enters the palm trunks through wounds or cracks. The disease seems to be associated with heavy watering, where sprinklers throw streams of water on the trunks of the trees.

Dr. Darley said the fungus associated with the disease is similar to that which causes the brown rot gummosis disease in citrus trees, which has been found in the Coachella Valley. The fungus has been found in every one of the palm trees killed by the rot and also in the soil around it.

Science News Letter, July 12, 1952

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AERONAUTICS

Dispute Rear-Facing Seats

► THE DISPUTED question of whether airplane passengers in rear-facing seats are less likely to be injured in case of a crash than those in conventional front-facing seats is still unsettled.

Pros and cons are discussed in a bulletin issued by Cornell Medical College, New York. The report is by Dr. Hugh De Haven, director of the college's crash injury research. This organization investigates crashes and the causes of injuries and fatalities in survivable accidents.

These are crashes in which there are survivors, or in which there might have been if proper safety equipment had been available.

The conclusions reached are that forward-facing seats and secure tie-down for proper safety belts should give high degree protection in civil transports, up to the point where flooring and surrounding cabin structures are destroyed.

Enough actual crashes of planes with rearward-facing seats have not been investigated to provide sufficient information on the protective values of various types now in use. The principal use of rear-facing seats is in military planes.

Those maintaining that rear-facing seats are protection against injury when a plane makes a quick stop in a crash landing, base their conclusion on the fact that the whole body, including the head, has the back of the seat to absorb the shock.

In a similar crash with front-facing seats and the usual type of safety belt, the body is thrown forward at an accelerated speed from the position of the belt upward, an action that may result in internal injury or injury to the head if it strikes the seat in front.

"With regard to design concepts for rearward facing seats," the report states, "it should be recognized that, as a rule, the force of crash is anything but directly forward. Often, in transport accidents which are survivable, there are conditions of bouncing, tumbling, cart-wheeling and sliding—sometimes inverted, sometimes on one side and sometimes going backward. Therefore, most of the safety considerations which pertain to the back-rests of forward-facing seats should be included in the design of back-rests for rearward-facing seats."

Science News Letter, July 12, 1952

AGRONOMY

7,000 More Each Day

► BY 1975, it is estimated that there will be 34,000,000 more people in the United States who will want to be as well fed and clothed as we are today.

"There will be about 7,000 more persons for breakfast tomorrow morning in the United States than we had this morning," Dr. A. H. Moseman, chief of the Bureau of Plant Industry, Soils and Agricultural Engineering, U. S. Department of Agriculture, said at the dedication of the new Agronomy Building at the University of Nebraska, Lincoln, Neb.

To meet the demands of our increasing

population, it is necessary to explore every phase of soil-plant-fertilizer-moisture relationships and to develop new varieties of crops to meet the demands of increased mechanization on the farm and the decreasing numbers of agricultural workers.

"Corn lands will have to yield about 20% more per acre in 1975 than they yield today," Dr. Moseman continued. The cotton breeders must improve the crops to compete with synthetic fiber manufacture. Sugar beets must be converted to meet the demands of mechanization and to resist storage rot. Scientists are engaged in an active campaign to design crops that are resistant to diseases, insects and chemicals used in weed and pest control.

With rapid change-over to new varieties of plants, a new disease can become menacing in a shorter time than previously. Studies abroad enable us to combat diseases before they reach the United States.

It is necessary to find ways of reversing the process of the decline in nitrogen and organic matter content in the soil. The increased use of fertilizers, soil conditioners, herbicides, and antibiotics on the farm has been a productivity booster, but we are still lagging in our understanding of these agents' effects on soil and crops.

Research on the food problem today involves teams of agronomists, entomologists, plant pathologists, agricultural engineers,

soil scientists, animal and dairy specialists and agricultural economists and depend on sufficient helping hands and supporting funds to work effectively. The problem they solve "should head off troubles before farmers have to meet and pay for them," Dr. Moseman said.

Science News Letter, July 12, 1952

MAMMALOLOGY

Age Told by Layers In Elephant Seal Teeth

► THERE ARE better tests of age than looking a gift mammal in the mouth. In fact, going into the mouth, yanking out a tooth and making a cross section of it may provide an exact measurement of the age of some mammals.

Experiments with the permanent canine teeth of elephant seals have shown that it is possible to determine age to within a month, up to age 20 in the male and age 13 in the female. A superficial examination of other mammals, living and fossil, indicates that the same kind of test might be used on them.

Periods of fasting, molting and breeding during the annual cycle of the elephant seal produce concentric rings in the canine teeth. By counting these rings, the age may be determined.

The experiments were carried out by R. M. Laws of Cambridge University's department of zoology and reported in the British scientific journal NATURE (June 7).

Science News Letter, July 12, 1952

Questions

CRYOGENICS—What is the lowest temperature yet reached by man? p. 26.

...

ENTOMOLOGY—How is the current locust plague being controlled for the first time in history? p. 22.

...

MEDICINE—What new remedy is available for poison ivy victims? p. 27.

...

PHYSIOLOGY—Why should you watch carefully the amount of extra salt taken in hot spells? p. 22.

...

PSYCHOLOGY—What is the best attitude for a good labor mediator? p. 23.

...

PUBLIC HEALTH—What are five rules for beating the heat? p. 22.

...

Photographs: Cover, American National Red Cross; p. 19, Lockheed Aircraft Corp.; p. 21, Chrysler Corp.; p. 23, U. S. Department of Agriculture; p. 26, Fremont Davis.



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PHYSICS

Flying 60 Miles Aloft

Repairing plane flying very high in the sky is no trouble, but bailing out from that altitude, pilot is either too hot or too cold.

► IF YOU are flying 40 to 80 miles up and something goes wrong with your plane, you can get out, walk on the outside of the plane to the trouble and repair it.

If, at the same height, something is irreparably wrong with your plane, you can bail out as easily as though you were getting out of a parked car in not more than a 25-mile-an-hour wind.

If you have to bail out, you are in danger of being too hot for safety before you get to 30,000 feet. After that you will be in danger of freezing to death.

If you bail out over New York, you will land as far away as Washington, or any point on a circle with a 250-mile radius from New York.

But, if you venture out of your plane, or rocket ship, or guided missile at such great heights, you will need either a pressure-tight space suit or a capsule encasing you, or else you will not live.

These are some of the conclusions based on a study of the problems of bailing out at high altitudes conducted by Dr. Fritz Haber at the Department of Space Medicine at the U. S. Air Force School of Aviation Medicine, Randolph Field, Texas.

"We should face the fact," he said, "that flight in the aero-pause is the next step, with speed in the range of Mach number 10 to 20 (10 to 20 times the speed of sound) and with altitudes in the range of 200,000 to 400,000 feet."

He pointed out that, at such altitudes, practically all of the entire air mass is left below with the exception of only about one-millionth. In these conditions, at 300,000 feet, the air resistance to a body is less than one-tenth of body weight, a force which will by no means hamper the pilot in leaving his cockpit.

However, he has the problem of getting back to earth alive, and in one piece. According to Dr. Haber, he is diving into the air "ocean." With no wind resistance before he falls into an appreciable amount of air, his terminal velocity becomes very high, so great that it is the order of Mach number three.

But, Dr. Haber pointed out, as the air resistance increases, the falling body slows down, until, at about 30,000 feet, it has just about the speed of a man who has been ejected from a plane flying at "conventional" heights.

Above that height he is surrounded by temperatures that reach 5,000 to 7,000 degrees Fahrenheit. But, because heat transference is so small at such altitudes, the problem, although still serious, is greatly lessened. Below 30,000 feet he enters a very cold atmosphere. Therefore, according to Dr. Haber, his space suit or capsule must be built to withstand both extremely hot and extremely cold temperatures.

Science News Letter, July 12, 1952

VETERINARY MEDICINE

Find Anti-TB Substance

► DISCOVERY OF an anti-TB germ substance in lymph nodes of tuberculous cattle is announced by Dr. M. A. Soltys of the department of veterinary pathology, University of Liverpool, England.

The substance checks the growth of both human and bovine tuberculosis germs. Dr. Soltys mixed the gland extract with TB germs virulent enough by themselves to produce tuberculosis in guinea pigs within six weeks after injection.

The mixture of germs and gland extract was kept at room temperature for four or seven days and at the higher incubator temperature of 98.6 degrees Fahrenheit for 48 hours. All guinea pigs injected with mixtures treated in these ways were free of visible signs of disease at the end of six weeks.

Shorter contact between the tuberculous lymph gland extract and the TB germs,

however, was not enough to inactivate the germs.

Lymph glands from non-tuberculous cattle and from guinea pig spleen failed to produce any substance that would inactivate TB germs.

Dr. Soltys has not yet done enough experiments to know whether the anti-TB germ substance he has found is an immune body developed in the course of the TB infection in the ox or whether it is similar to spermine which Drs. J. G. Hirsch and R. J. Dubos of the Rockefeller Institute, New York, have reported.

The value of the extract-treated TB germs as a vaccine against tuberculosis and the possible value of the extract in treatment of the disease are now under study and will be reported later, Dr. Soltys says in his report in NATURE (June 28).

Science News Letter, July 12, 1952

Do You Know?

About 67% of all adults wear eyeglasses.

Crabs sometimes put sponges on their backs for camouflage purposes.

Marbles thrown into a fish hatchery stimulate spawning.

Fires kill or seriously injure an average of 84 persons daily.

The mercury column in fever thermometers is about one-tenth the breadth of a human hair.

Treatment and prevention of gum disease depends largely upon the patient's own care of his mouth.

Citronella oil is used not only as an insect repellent, but also as an oily base and as a fragrance in perfumes and soaps.

If caught in quicksand, a person should try to float on his back as he would in water; his movements should be very slow to eliminate the "sucking" effect.

At least 5,000 different kinds of insects in the United States cause an annual loss between three and five billion dollars in terms of ruined crops, sick cattle and spoiled plants.

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► **THREAD HOLDER**, made of aluminum and covered with a transparent dust cover, will accommodate 42 spools of thread and two pairs of scissors. The unit can be obtained unfitted or completely furnished with high-quality thread and scissors.

Science News Letter, July 12, 1952

► **MOVIE SCREEN**, designed to be used on desks and table tops instead of on a special stand, has rubber-tipped fold-away feet to protect the furniture on which it is placed. The light-weight, portable, roll-up screen also can be hung on walls.

Science News Letter, July 12, 1952

► **LOADING UNIT** for trucks handles four and a half cords of lumber at once in strongly braced steel frames. Trucks equipped to use the frames pull the load of wood aboard with a winch.

Science News Letter, July 12, 1952

► **SALT AND PEPPER** shakers in gay colors fit into holes of a miniature camel's back to form his humps. Made of plastic, the inexpensive novelties can be given to children as individual salt and pepper sets.

Science News Letter, July 12, 1952



► **TOY BULLDOZER** built to scale, is one-twelfth the size of a well-known commercial make, and has a three-position, movable blade. The toy, which weighs five pounds, is shown in the photograph. It was built in response to children's requests and

is made largely of 18-gauge spot-welded steel.

Science News Letter, July 12, 1952

► **BRAKE-LINING UNIT**, attachable to many automotive brake shoes, is easily installed with ordinary hand tools, thus eliminating bonding or riveting. Consisting of a brake lining bonded to a metal backing-plate, the unit delivers up to twice the life of present riveted lining units.

Science News Letter, July 12, 1952

► **FLUORESCENT LAMP**, designed for new lighting systems, comes on quickly without external starters. Made in 40-watt sizes, the lamps light in about one second after being turned on, and will not flicker. The ballast is smaller, cheaper and quieter than ballasts used previously.

Science News Letter, July 12, 1952

► **MINIATURE WIRE**, in sizes ranging from 94.2 to 675.00 circular mils, has an impervious fused insulation designed to provide high dielectric strength and good heat-resisting qualities. The insulation is chemically inert and non-inflammable.

Science News Letter, July 12, 1952

• Nature Ramblings •

► **THE INVENTION** of the cotton gin made cotton the South's principal crop. The steel plow and the reaper hastened the shift of the grain belt from the hills of the East to the prairies of the West.

The linotype and the rotary press, by greatly cheapening printed matter and thus increasing its use, have created a crisis in forestry, with easily accessible native stands of timber being wiped out faster than new pulpwood is being grown.

In a little less obvious way, the invention of barbed wire has caused the near-disappearance of the Osage orange, a once-familiar high shrub or small tree.

When the prairie lands of the Midwest were being opened up, a century or so ago, the most easily available way of dividing field from field, and of keeping stray cattle on the road from getting into the corn, was to plant a hedge.

Neither the rail fences made of split logs from cleared land farther east, nor the stone walls of the Atlantic seaboard, were practicable on the prairies, where there were few trees and even fewer stones.

Technological Unemployment



Most practical hedge plant was the Osage orange. It is a native plant, with its center of distribution in the Ozarks and nearby regions, so it was readily available and already acclimated. It grows rapidly and branches freely if cut back, so can be induced to form a thick, stout hedge in a short time. And it is armed with most formidable thorns, discouraging to would-be animal trespassers.

Early nurserymen grew great stocks of it and sold young plants by the millions.

From the sixties to the nineties of the last century there were literally thousands of miles of Osage hedge. If you went for a buggy-ride in the country, you were almost continuously "hedged in" by the thick shrubs, trimmed waist-high, on both sides of the road.

Then somebody conceived the idea of putting steel thorns on twisted wire, and invented a machine for making the stuff. A barbed-wire fence took less space than a hedge, which of course claimed several yards of soil on either side of itself for its own nutrition. Thus a fence materially increased the tillable area of each field.

So the hedges began to decline. Farmers dug them out or hired professional crews with steam-powered machinery to root them up with giant plows. The smoke of their burning drifted over all the land.

Here and there, stretches of hedge still survive, usually neglected and allowed to grow to full height of 20 or 30 feet. But they are only fragments of what was once the wide-ranging, Midwest empire of the Osage orange.

Science News Letter, July 12, 1952